

Claims

1. A system for detecting contaminants in or on objects, comprising:
 - a. a movably mounted container for holding objects and having a plurality of perforations and an entrance opening through which objects may be placed into said container;
 - b. a housing enclosing said container and forming a barrier to ambient air and having a sealable opening for inserting and removing objects from said container;
 - c. means for moving said container within the housing to move objects therein for emitting particles which are in or on such object;
 - d. means providing an air stream for moving air through said housing and container to entrain any emitted particles into the air stream; and
 - e. a sensor for sensing contaminants in the air stream and providing a signal when a contaminant is sensed.
2. A system as defined in claim 1 wherein said container is a rotatable cage, or a vibrating box and said air stream providing means directs the air stream from the center of the container through the perforations in the container and into the housing.
3. A system as defined in claim 2 wherein the housing has an air inlet and an air outlet.

4. A system as defined in claim 3 wherein there are a plurality of containers and housings which are independently operable with respect to each other.
5. A system as defined in claim 4 wherein there are a plurality of sensors of different types forming a sensor suite.
6. A system as defined in claim 5 further comprising a discharge bin at the lower end of each housing and into which the objects therein are deposited when no contaminants are sensed.
7. A system as defined in claim 6 wherein the means for providing an air stream includes an air duct system which provides the air stream to the center of the container where it entrains emitted particles and directs the air stream past said sensor.
8. A system as defined in claim 6 wherein said container has a closable door for closing said entrance opening.
9. A system as defined in claim 8 wherein the means for providing an air stream includes an air inlet and an air outlet in said container.
10. A system as defined in claim 8 further comprising a neutralization assembly for injecting a contaminant neutralizer into the air stream when said

sensor detects a contaminant.

11. A system as defined in claim 8 wherein said rotatable cage is six sided.

12. A system as defined in claim 11 wherein all six sides of said cage have perforations to permit air and particulates to pass therethrough.

13. A system as defined in claim 8 further comprising a controller for sequencing operations of said moving means, said air stream providing means, said sensor, and said discharge bin.

14. A system as defined in claim 13 further comprising:
a neutralization assembly for injecting a contaminant neutralizer into the air stream when said sensor detects a contaminant, and said controller also controls the operation of said neutralization assembly.

15. A system as defined in claim 8 wherein said sensor suite comprises:
at least one real-time sensor to sense said at least one contaminant, said contaminant being selected from the group of biological particles, chemical particles, and pathogens.

16. A system as defined in claim 8 further comprising an indicator subsystem which provides an indication when at least one contaminant is detected.

17. A method for detecting contaminants in and around objects, comprising the steps of:
- a. providing a chamber which may be sealed with respect to ambient air to create an enclosed atmosphere;
 - b. loading a plurality of objects into or onto a perforated container disposed within the enclosed atmosphere;
 - c. creating an air stream within the enclosed atmosphere;
 - d. agitating the objects to cause the objects to emit particles therefrom into said air stream;
 - e. testing the air stream to determine whether it contains any contaminants; and
 - f. providing a signal when a contaminant is detected.
18. A method as defined in claim 17 wherein the agitation is provided by a rotating cage having openings in its sides.
19. A method as defined in claim 17 where the agitation is provided by a vibrating surface having openings therein.
20. A system as defined in claim 17, further comprising the step of discharging the objects from said chamber when no contaminants are detected.